Delineation of Regional Ecosystems

Pace Wilber, NOAA

August 31, 2004

Reorganization Act (P.L. 91-5 6)

- "I have therefore issued a directive which streamlines the field operations of five agencies by establishing, for the first time, <u>common regional boundaries and regional office</u> locations."
- "I am asking all other Federal agencies to take note of these instructions, and I am requesting that any changes in their field organization structures be made consistent with our ultimate goal: uniform boundaries and field office locations for all social or economic programs requiring interagency or intergovernmental coordination."
- Source: The Public Papers of the Presidents, Richard Nixon, March 27, 1969, #134

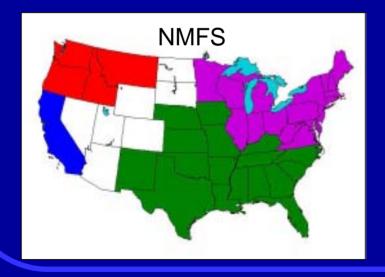
US Environmental Protection Agency



NOAA Fisheries and USFWS

Purpose

 Provide regional management of national resources



Criteria

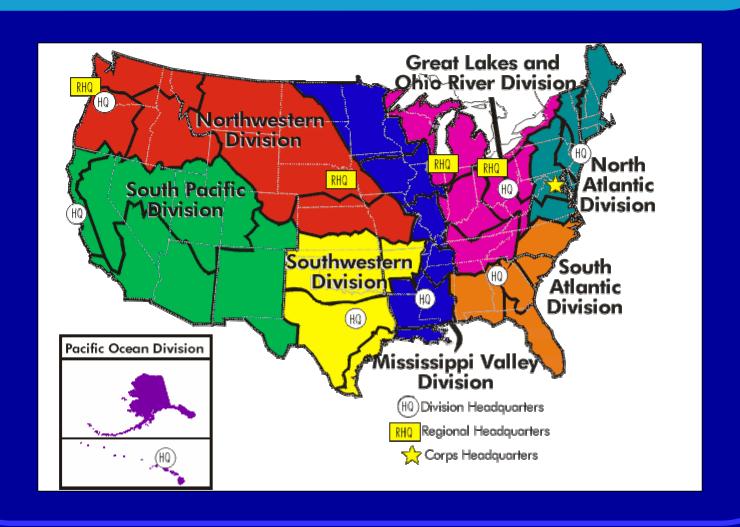
- Political
- Geographic proximity



Fishery Management Councils



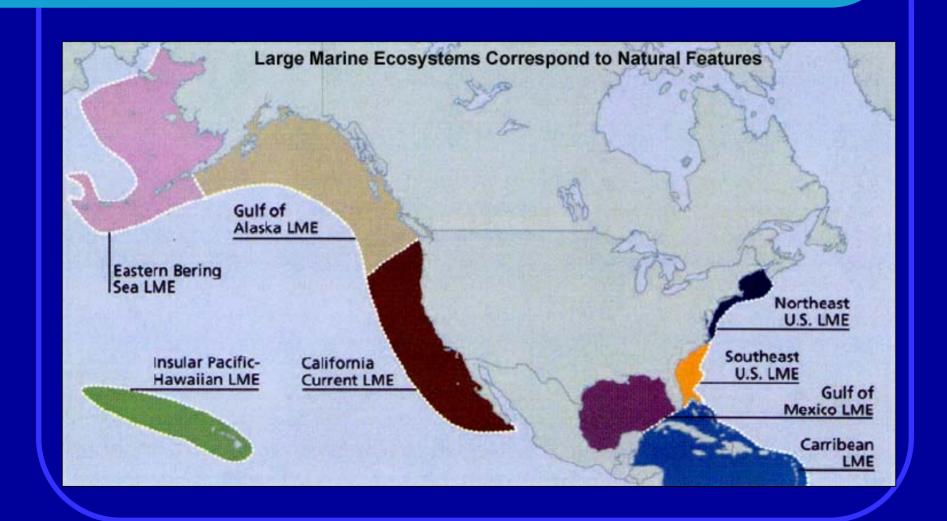
US Army Corps of Engineers: Divisions and Districts



Large Marine Ecosystems



Large Marine Ecosystems



Large Marine Ecosystems

Purpose

- Useful to ecosystembased projects
- Modules support transboundary diagnostic analysis (TDA) and strategic action plan (SAP) development

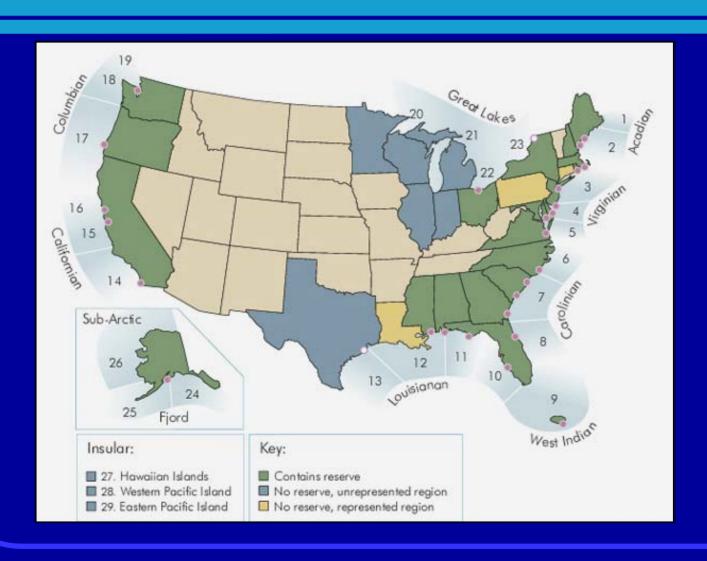
Criteria

- Bathymetry
- Hydrography
- Productivity
- Trophic Interactions

LME's in the Western and Central Pacific



National Estuarine Research Reserves: Biogeographic Regions (15CFR921)



NERRS Biogeographic Regions

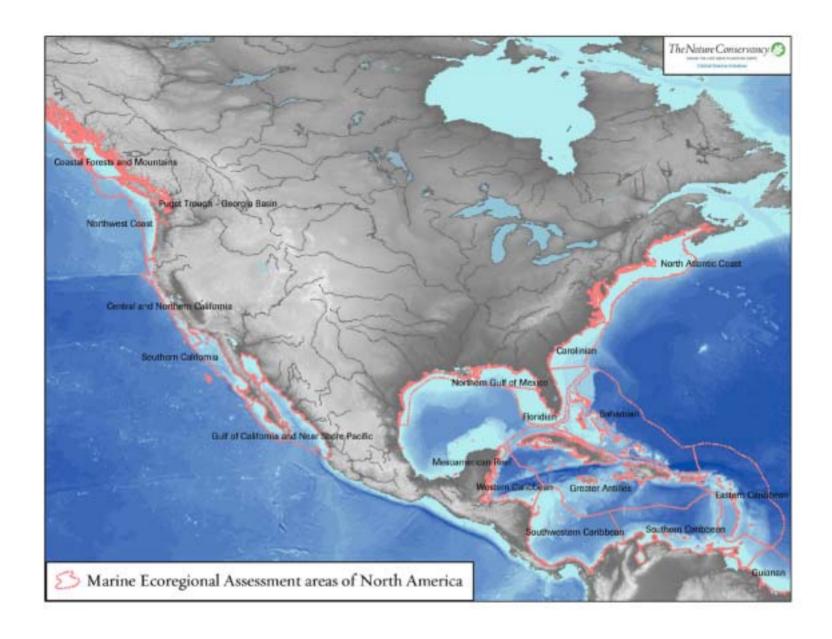
Purpose

Research
 representative
 estuary ecosystems
 in all biogeographic
 regions of the U.S.

Criteria

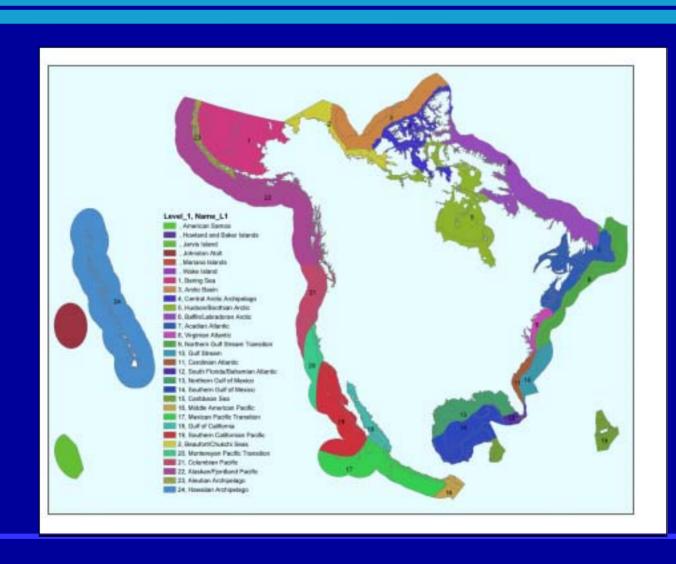
Coastal zone characteristics

- Terrestrial
- Estuarine
- Nearshore



Conservancy (Terrestrial and Marine Ecoregions of the United States 12. Dierra Novada 13. Great Control Visley. 16. California Night: Coast 10. California Cantral Coast 16. Celfornia South Coest 17. Moisso Desert 16. Uton High Photosus 19. Colorado Parteau 20. Saufrem Rocky Mountains 21. Attawa New Mexico Mountains 22. Agractive Highlands 23. Sanoran Desert 24. Chihushuan Desert 25. Black Hills 25. Northern Great Plains Steppe 27. Central Shortgross Preirie 26. Sauthern Shortgross Prairie 29. Ethyanda Pleteau 30. Terravigen Them Scrub 31. Gulf Coast Prairies and Marshes. 30. Crassforbers and Southers Taligrass Proifie 33. Central Mixed-Diasa Prents 34. Dakota Mosci-Grass Premis-35. Northern Talloress Profile 62 35 36. Central Taligress Proine 34 25 37. Osage Plans/First Hills Prairie 60 A6 36. CEN'NS 39. Quachts Mountains 40. Upper West Out Coastel Plans 194 41. Viest Gulf Cosetal Plain 47. Mississippi Pitner Albakat Plans 43: Upper Fast (fat) Coette Plain 500 44. Intertor Law Plateau 45. North Central Tiliplain 45. Prains-Potest Border 47. Superior Mixed Porest 33 40. Great Lakes 40. Western Alleghony Plateau 50. Cumberlands and Southern. Ridge Valley St. Southern Blue Ridge 40 38 52. Fledmont 57 53. Field Gulf Coastal Plain 51 54. Tropical Florida 55. Floride Peninsula 56, South Attentic Coastal Plain 57. Md-Allardic Coostel Plain 59. Chesapeake Bay Londands 50. Central Appellachien Porest 60. High Alleghery Placesu 61. Lower New England / Northern 56 Paidniord 40 62. North Atlantic Coast. 32 63. Northern Appatechen-Bornel Forest 64. St Lawrence-Champiain Valley 65. Havatier High Islands 66. Aspen Partiand 29 67. Fescule-lifted Grass Prairie 66. Chanagen 69. S.E. Alaska - B.C. Countel Forest 55 and Mountains 70. Quiff of Allerka Mountains and Flordients 71. Cook Intel Basin 72. Alitaku Penimulia. 73. Bering See and Moutton Islands 74. Brtatol Bay Dasin 76. Beringian Tundre 76. Alaska Range 77. Inferior Aloska Targe 76, Yukon Plateau and Flats. 79. Alasko-Yukon Andic Copyright © 2004 The Nature Consenvercy Data Sources TMC, 2004; Bailey, 1995. 81. West Coscudes 80, Northern Quif of Mexico Value: E.B. 1900; ESRI, 2002 1. Pacific Northwest Coast 2. Puget Trough - Willemarks Valley 82. Hondan Map produced by L. Saturnayor - Clobel Priorities Croup-80. Carolinian Deorgie Basin 84. Virginieri I. North Cascades 85 Apadian 4. Modoc Plateau and East Cascades 85. Southern California 5. Klemath Mountains 87. Central and Northern California 6. Columbia Pleteau 55. Northwest Coradian Rocky Mountains 88. Coastas Forests and Mountains. 5. Middle Roddies - Diue Mountains 90. Southern Alaska 9. Litah-Wiyaning Racky Mountains. 91. Being Dos 10. Wyoming Easins. 92. Hermiten bitanda

NA Commission on Environmental Cooperation Marine Ecoregions, Level 1



North American Marine Ecoregions (CEC)

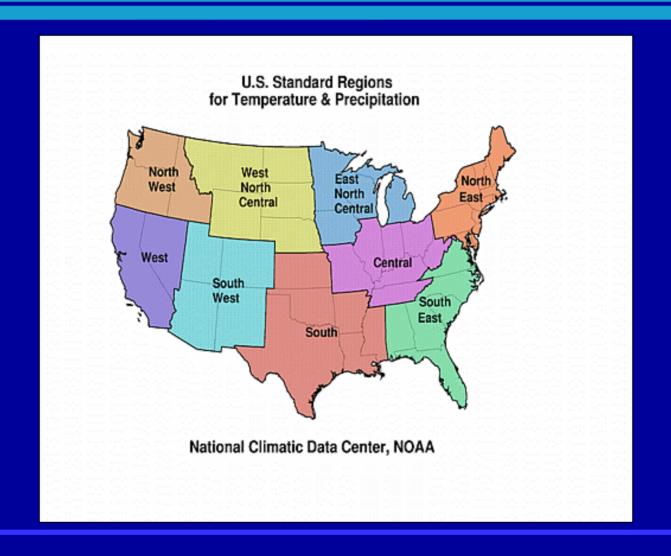
Purpose

- Address regional concerns
- Prevent trade and environmental conflicts
- Promote
 enforcement of
 environmental law

Criteria for Level 1

- Large water masses
- Major currents
- Large enclosed seas
- Sea surface temperature
- Faunal distribution

NOAA National Climatic Data Center: Regions & Coastal Climatologies



IOOS Regions



Integrated Ocean Observing Systems

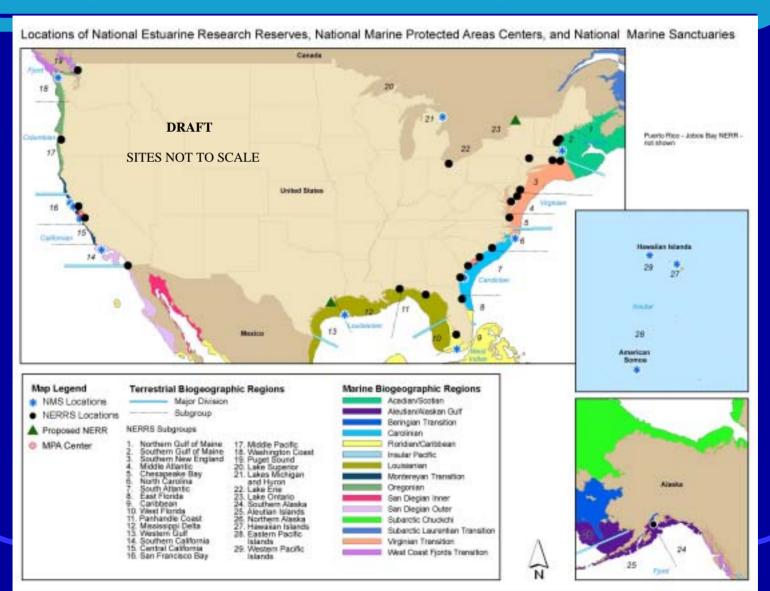
Purpose

- Provide data on oceans, EEZ, and estuaries.
- Coordinate observing and prediction systems.

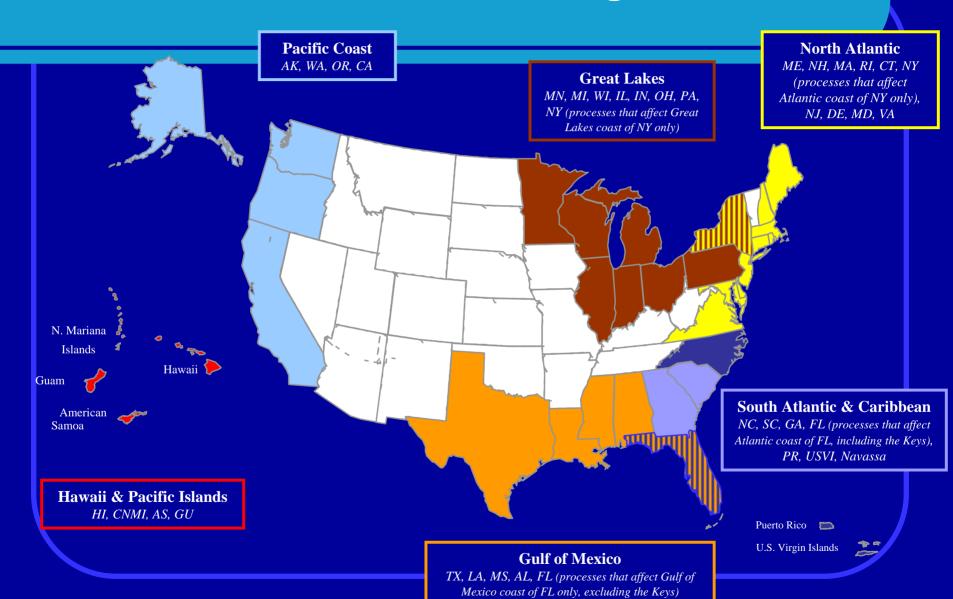
Criteria

- Exact boundaries currently being defined.
- User groups will play a role in the design of system.
- Boundaries will be fixed for admin. purposes.
- Boundaries will vary spatially for detection/prediction purposes.

Marine Protected Areas (39) and National/Regional Centers (FY2006 PPBS Process)



MPA Recommendation 2: 6 Regions



Regional Ecosystems Based on LME's / Practical Considerations

- Geographic range of species (from sedentary to highly migratory)
- Scale and importance of species interactions
- Oceanographic processes/regimes

- Political geography
- Effects of human activities
- Spatial discontinuities
- Oceanographic regime discontinuities

Analysis of Important Criteria to Consider: Physical

Bathymetry

Hydrography

- Water mass characteristics
- Temperature

Other

- Bottom composition
- Water depth

Analysis of Important Criteria to Consider: Biological

Productivity
Trophic interactions
Patterns of
biogeography

- species richness
- endemism

Structure of patterns

Breaks in productivity

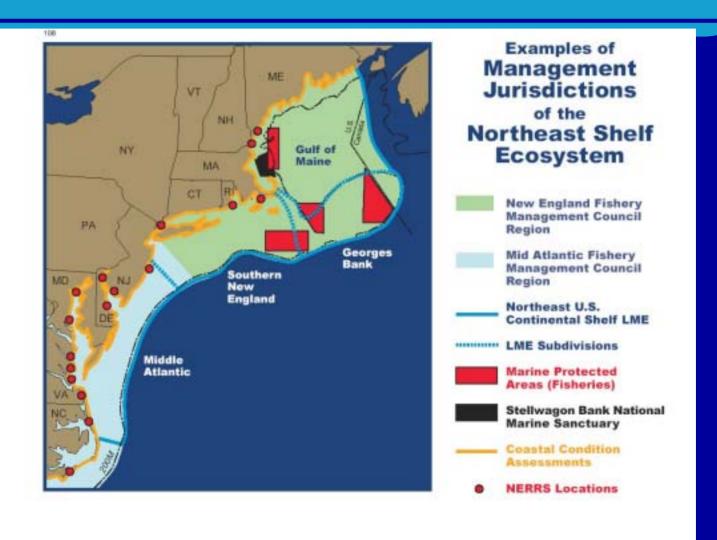
- Primary productivity
- Growth rates of species
- Recruitment retention areas

Analysis of Important Criteria to Consider: Non-scientific

Collaborating mechanisms

Number of collaborators

Sub-areas of the Northeast LME



National Climate Data Center (NCDC) Regions

Purpose

- Manage global climate information.
- Gather and provide information on regional, state, and sub-state levels.

Criteria

Areas of similar climate regime

- Temperature
- Precipitation

Ocean Commission Information Programs

Purpose

Regional ecosystem assessments

- Inventory
- Evaluation of attributes
- Baseline ecosystem health
- Enhance decisionmaking ability

Criteria

Not listed in Preliminary Report

Private Sector

Resilience Alliance

Social-ecological system comprised of:

- Ecosystem
- Resource users
- Governance structure
- Institutions
- Public infrastructure

The Nature Conservancy Marine Ecoregional Plans

- Northern Gulf of Mexico
- Pacific Northwest
- Southern California
- Mid-South Atlantic

Fishery Management Councils

Purpose

 Manage living marine resources in the council region

Criteria

Geopolitical concerns(not ecological)

Additional Slides

Analysis of Important Criteria to Consider: Biological

Productivity
Trophic interactions
Patterns of
biogeography

- species richness
- endemism

Structure of patterns

Breaks in productivity

- Primary productivity
- Growth rates of species
- Recruitment retention areas

Regional Delineation Schemes

- Political
 - EPA, USFWS, NMFS, FMC regions, Coastal states
- Coastal focused
 - TNC Marine Ecoregional Planning, NA CEC, NERR
 - CAF (EDA/CDA), HUC, USACE, EPA Ecoregions
- Offshore, Marine focused
 - LME → Estuary → Drainage basin
 - Biogeochemical Provinces (Longhurst 1998)